

We Claim:

1        1. An imaging module comprising:  
2            a first circuit board;  
3            an image sensor carried by said first circuit board;  
4            a pair of aiming LEDs mounted on said first circuit board  
5 laterally relative to said image sensor;

6            a one piece support assembly having a front and rear  
7 comprising a containment section, a forwardly extending  
8 retainer section, and a pair of aperture defining members  
9 extending laterally from said containment section, wherein a  
10 rear of said one piece support assembly is received in  
11 abutting relation on said first circuit board so that said  
12 containment section encapsulates said image sensor and said  
13 aperture defining members are in opposing relation with said  
14 aiming LEDs, said aperture defining member having apertures  
15 defined thereon for stopping light emitted by said aiming  
16 LEDs; and

17            a second circuit board received in abutting relation with  
18 a front surface of said support assembly, said circuit board  
19 having a central aperture through which said forward extending  
20 retainer section extends when said second circuit board is  
21 abutted against said support assembly, and  
22            a plurality of illumination LEDs mounted to said second  
23 circuit board.

1        2. The imaging module of claim 1, further including a  
2 lens plate, said lens plate carrying at least one optical  
3 element for shaping light from either of said aiming or  
4 illumination light source.

1        3. The imaging module of claim 1, further comprising an  
2 optical plate, said optical plate carrying at least one  
3 optical element for shaping light from one of said aiming LEDs

4 and at least one optical element for shaping light from one of  
5 said illumination LEDs,

1       4. The imaging module of claim 1, further comprising a  
2 one piece optical plate which is received in abutting relation  
3 with said second circuit board, said optical plate including  
4 diffusers for diffusing light from said illumination LEDs and  
5 imaging lenses for imaging light from said apertures to  
6 project an aiming pattern on a target.

1       5. The imaging module of claim 4, wherein said module is  
2 adapted so that an aiming pattern projected by said imaging  
3 lenses is a split horizontal line extending across a center of  
4 a field of view of said module.

1       6. The imaging module of claim 1, wherein said retainer  
2 includes a pin receipt aperture and an adhesive receipt  
3 aperture.

1       7. The imaging module of claim 1, wherein said support  
2 assembly and said second printed circuit board include key  
3 structures so that said second circuit board and said support  
4 assembly matingly engage one another when abutted together.

1       8. An optical reader imaging module, said module  
2 comprising:

3           a printed circuit board;  
4           a two-dimensional image sensor back mounted on said  
5 printed circuit board imaging optics carried out by said  
6 module adapted to focus target indicia onto said image sensor;  
7           an illumination assembly consisting of a single  
8 horizontally arranged substantially linear array of light  
9 sources mounted on said circuit board;  
10          at least one optical diffuser positioned forward of at  
11 least one of said light sources of said linear array of light  
12 sources, wherein said diffuser is adapted to diffuse light

13 from said light sources vertically.

1        9. The illumination system of claim 8, wherein said at  
2 least one diffuser is provided by a horizontally oriented  
3 cylindrical negative lens.

1        10. The illumination system of claim 8, wherein said at  
2 least one diffuser is provided by a plurality of horizontally  
3 oriented cylindrical microlenses.

1        11. An imaging module comprising:  
2            a printed circuit board;  
3            an image sensor in electrical communication with said  
4 printed circuit board;  
5            imaging optics for focusing target indicia onto said  
6 image sensor;  
7            a support assembly mounted to said printed circuit board;  
8 and  
9            a plurality of light sources in electrical communication  
10 with said printed circuit board.

1        12. The module of claim 11, wherein said printed circuit  
2 board has extending thereon a heat sink tab for reducing a  
3 temperature of said module.

1        13. The module of claim 11, wherein said retainer  
2 assembly is supported in said imaging module entirely by said  
3 connection to said circuit board.

1        14. The module of claim 11, wherein said printed circuit  
2 board is a flex strip circuit board.

1        15. The module of claim 11, wherein said module further  
2 has connected thereto at least one light pipe for transmitting

3 light emanating from at least one of said light sources.

1       16. The module of claim 11, wherein said image sensor is  
2 back mounted to said printed circuit board, and wherein said  
3 support assembly includes a retainer section folding optics  
4 for shaping an imaging axis of said module so that said  
5 imaging axis partially extends substantially parallel to said  
6 circuit board.

1       17. The module of claim 11, wherein said printed circuit  
2 board is a flexible circuit board, and wherein said module  
3 further includes at least one light pipe for transmitting  
4 light emanating from at least one of said light sources and  
5 for directing said transmitted light toward a target arena.

1       18. The module of claim 11, wherein said module includes  
2 an illumination assembly and an aiming assembly, said  
3 illumination assembly and said aiming assembly including a  
4 common optical plate carrying optics of both of said aiming  
5 and said illumination assemblies.

6       19. The module of claim 11, wherein said plurality of  
7 light sources comprise aiming LEDs and illumination LEDs,  
8 wherein said aiming LEDs are selected to have radiation  
9 patterns more narrow than said illumination LEDs.

1       20. The module of claim 11, wherein said module includes  
2 at least one form fit diffuser fit over at least one of said  
3 light sources.

1       21. The module of claim 11, wherein said printed circuit  
2 board includes a machined away cavity;  
3       a reflective material disposed in said cavity, and LED  
4 die disposed in said cavity, and a semitransparent sealing  
5 layer layered over said cavity.